IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Cohen, et al.	§	
	§	
Serial No.: 09/388,989	§	Group Art Unit: 1762
	§	
Confirmation No.: 4766	§	Examiner: Padgett, Marianne L.
	§	
Filed: September 2, 1999	§	
	§	
For: SEQUENTIAL SPUTTER AND REACTIVE PRECLEANS OF VIAS AND CONTACTS	§	

MAIL STOP APPEAL BRIEF-PATENTS
Commissioner for Patents
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37 CFR 1.8
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1/14/05 — Date
Kevin Zuber — Signature

Dear Sir or Madam:

APPELLANT'S REPLY BRIEF

Appellants submit this Reply Brief to the Board of Patent Appeals and Interferences in response to the Examiner's Answer dated November 18, 2004. The Examiner's Answer was in response to the brief on appeal filed January 26, 2004. Claims 1, 3, 4, 6, 8-14, and 17-33 are pending in the application and on appeal from the decision of the Examiner of Group Art Unit 1762 dated December 22, 2003, finally rejecting claims 1, 3, 4, 6, 8-14, and 17-33. Appellants have separately requested an oral hearing. Copies of this Reply Brief are submitted for use by the Board.

Appellants acknowledge and thank the Examiner for withdrawing the rejection of claims 1, 3, 4, 6, 8-14, and 17-33 under 35 U.S.C. § 103(a) as being unpatentable over *Yoo et al.* (U.S. Patent No. 5,203,957) in view of *Zhao et al.* (U.S. Patent No. 5,660,682). For the record, claims 1, 3, 4, 6, 8-14, and 17-33 now stand rejected only under 35 U.S.C. § 103(a) as being unpatentable over *Yoo et al.* (U.S. Patent No. 5,203,957) in view of *Yamazaki et al.* (JP 56-155,526).

The Examiner states that the "Summary of Invention" recited in the Appellants Brief is "deficient" because it refers to items not in the claims. (See Examiner's Answer at page 2, paragraph 5.) Appellants submit that the Summary includes a "concise explanation of the invention defined in the claims" that "refers to the specification by page and line number," which "enables the Board to more quickly determine where the claimed subject matter is described in the application," in compliance with MPEP §1206. There is no requirement in the CFR or MPEP that the Summary refer only to items recited in the claims.

Arguments

THE EXAMINER ERRED IN REJECTING CLAIMS 1, 3, 4, 6, 8-14, 17-23, AND 33 BECAUSE *YOO ET AL.* IN VIEW OF YAMAZAKI ET AL. DOES NOT MOTIVATE OR SUGGEST A TWO STEP CLEANING PROCESS COMPRISING A FIRST PLASMA CONSISTING ESSENTIALLY OF ARGON AND A SECOND PLASMA OF HELIUM AND HYDROGEN.

Claims 1, 3, 4, 6, 8-14, 17-23, and 33 stand rejected under U.S.C. § 103(a) as being unpatentable over *Yoo et al.* (U.S. Patent No. 5,203,957) in view of *Yamazaki et al.* (JP 56-155,526). The Examiner states that *Yoo et al.* teaches a two step plasma etch process: (1) a first plasma of argon and (2) a second plasma of helium and CF_4 or CF_3H. The Examiner states that *Yamazaki et al.* discloses cleaning an insulating surface using a reducing atmosphere of hydrogen or hydrogen mixed with helium or argon, in order to remove dirt and impurities. The Examiner, therefore, asserts that "it would have been obvious to one of ordinary skill in the art to employ the active reduction gas H_2 in the process of *Yoo et al.*, because *Yamazaki et al.* shows that H_2 +

He plasma is analogously used to prepare insulating surfaces for metal deposition, where like metal may be deposited..., so one of ordinary skill would have expected effective equivalent results, with the deposition surfaces noted to have been activated for the metal deposition by the H_2 + He plasma treatment thus providing further motivation since ... as the process is taught to work for cleaning insulating or semi-insulating or Si..., its effectiveness for cleaning and preparing both the dielectric and the exposed underlying Si substrate in *Yoo et al.* is demonstrated." See Examiner's Answer at page 5. Additionally, the Examiner states that "substitution of H_2 for the CF_3H or CF_4 reducing gas of *Yoo et al.*, would have been obvious and motivated, as providing effects desired by and consistent with the teachings of *Yoo et al.* for effecting metallization." See Examiner's Answer at page 5.

To clarify the record, *Yoo et al.* does not disclose a helium and CF_4 or CF_3H gas mixture as the Examiner states at pages 3 and 5 of the Examiner's Answer. *Yoo et al.* discloses a gas mixture of CF_4/He at col. 5, line 7, and a gas mixture of helium, trifluoromethane and carbon tetrafluoride at col. 6, line 9 (emphasis added). Clearly, the emphasis on the second plasma disclosed in *Yoo et al.* is the fluorine atom that serves as a physical etchant.

Applicants respectfully traverse the rejection on grounds that the Examiner has not established a case of *prima facie* obviousness. "In determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." *See*, M.P.E.P. § 2141.02 citing *Stratoflex, Inc. v. Aeroquip Corp.*, 218 USPQ 871 (Fed. Cir. 1983). Here, the Examiner has attempted to arrive at the claimed invention by replacing the second step (fluoro-carbon/ helium gas mixture) of the two step process in *Yoo et al.* with the single step (hydrogen mixed with helium or argon) process taught by *Yamazaki et al.* The Examiner's motivation for doing so is that the two-step process of *Yoo et al.* is just as effective as the single step taught by *Yamazaki et al.* That is not a teaching or suggestion from the references themselves to combine the particular elements identified by the Examiner. At best, a combination of the prior art suggests substituting the single step process of *Yamazaki et al.* for the entire two step process of *Yoo et al.*

Moreover, the Examiner is picking and choosing random elements of each reference to arrive at the claimed invention. There is no evidence in the record for the Examiner to conclude that "one of ordinary skill would have expected effective equivalent results" between the hydrogen/helium plasma of *Yamazaki et al.* and the mixture of helium/CF_4/CF_3H of *Yoo et al.* The Examiner's "motivation" for combining these random elements of the prior art is merely an unsupported conclusion that the combined elements provide an obvious result. Unsupported legal conclusions and impermissible hindsight do not provide a proper basis to support a rejection based on *prima facie* obviousness. Therefore, the Examiner erred in rejecting the claims under 35. U.S.C. §103(a).

Furthermore, a proposed modification of a reference is improper if the modification renders the reference unsatisfactory for its intended purpose. *In re Gordon,* 221 USPQ 1125 (Fed. Cir. 1984). The replacement of the second step (fluoro-carbon and helium gas mixture) of the two step cleaning process of *Yoo et al.* with the helium and hydrogen mixture of the single step cleaning process taught by *Yamazaki et al.* would render *Yoo et al.* unsatisfactory for its intended purpose. The intended purpose of the fluoro-carbon and helium mixture of *Yoo et al.* is to physically etch a silicon surface to reduce the contact resistance that is increased during the previous argon sputter etching step, but only when a non-silicided device is subjected to the argon sputter step. (*See*, *Yoo et al.* at col. 5, lines 3-13.) In other words, *Yoo et al.* utilizes the fluoro-carbon as a physical etchant, not as a chemical reactant. Hydrogen gas would not physically etch the silicon substrate of *Yoo et al.* Therefore, the replacement asserted by the Examiner does not fit the intended purpose of *Yoo et al.* and is not a proper modification of the reference.

Conclusion

The combination of the references does not motivate or suggest a first cleaning step comprising a plasma consisting essentially of argon followed by a second cleaning step comprising a plasma consisting essentially of hydrogen and helium. Appellants submit that the pending claims are patentable over the references, and respectfully request withdrawal of the rejection.

Respectfully submitted,

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